Sensor integritY Management and Prognostics Technology with On-Line Fault Mitigation (SYMPTOM) for Improved Flight Safety of Commercial Aircraft, Phase I
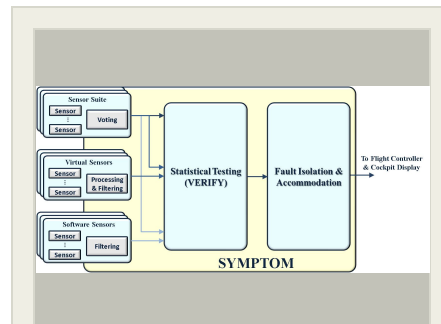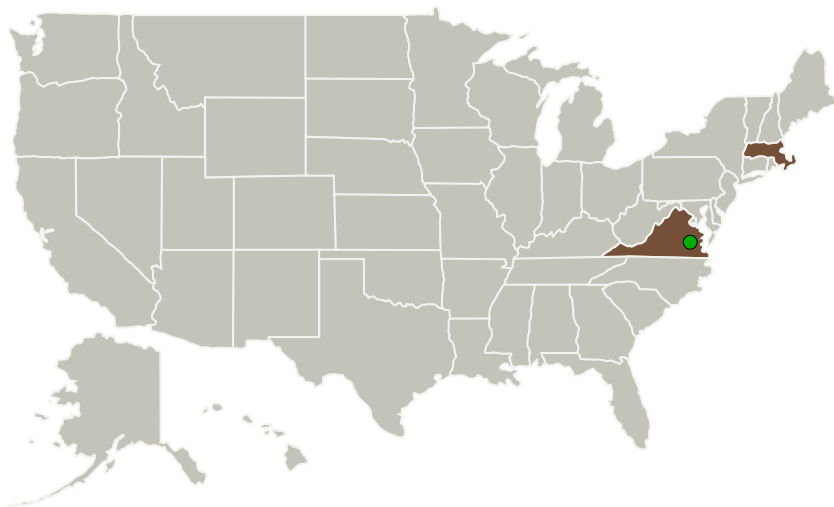
Completed Technology Project (2014 - 2014)

Project Introduction

SSCI proposes to develop and test the Sensor integritY Management and Prognostics Technology with On-line fault Mitigation (SYMPTOM) system. The SYMPTOM assures system integrity by fusing available information from a variety of similar and dissimilar sensors and other sources with advanced signal processing and dynamic equations of motion to arrive at high-confidence estimates of the current sensor health, rapidly and accurately detect and isolate the fault, and mitigate its effect before the information from the sensor has been sent to the flight controller and the cockpit display. The SYMPTOM system uses all available information relevant for flight-critical sensor Fault Detection, Identification and Accommodation (FDIA), fuses it to build virtual and software sensors, and applies advanced statistical tests, nonlinear estimation and prediction, and parameter estimation schemes to accurately detect, isolate and accommodate the faults in both individual sensors and sensor suites. The SYMPTOM leverages our previous work on single-thread sensor FDIA. In Phase II of the project, Boeing Phantom Works (Dr. Kevin Wise) will provide technical and commercialization support.

Primary U.S. Work Locations and Key Partners

Sensor integritY Management and Prognostics Technology with On-line fault Mitigation (SYMPTOM) for Improved Flight Safety of Commercial Aircraft Project Image

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Organizations Performing Work	Role	Type	Location
Scientific Systems Company, Inc.	Lead Organization	Industry Small Disadvantaged Business (SDB)	Woburn, Massachusetts
🟢Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations	
Massachusetts	Virginia

Project Transitions

▶ **June 2014:** Project Start

✅ **December 2014:** Closed out

Closeout Documentation:
- Final Summary Chart*(https://techport.nasa.gov/file/137721)*
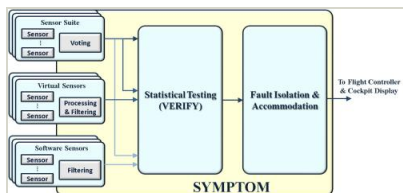
Images

Project Image
Sensor integritY Management and Prognostics Technology with On-line fault Mitigation (SYMPTOM) for Improved Flight Safety of Commercial Aircraft Project Image
(https://techport.nasa.gov/image/136438)

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Scientific Systems Company, Inc.

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Jovan Boskovic

**Small Business Innovation Research/Small Business Tech Transfer**

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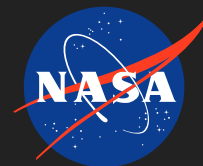
Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**

1	2	3	4	5	6	7	8	9

Applied Research	Development	Demo & Test
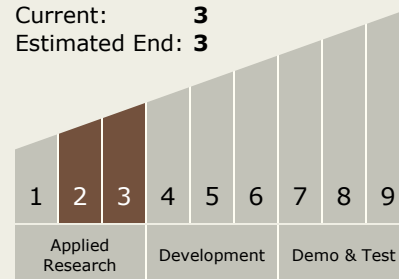
Technology Areas

Primary:

- TX11 Software, Modeling, Simulation, and Information Processing
  └ TX11.1 Software Development, Engineering, and Integrity
    └ TX11.1.4 Operational Assurance

Target Destinations
The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System

Tech Port

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For more information and an accessible alternative, please visit:
https://techport.nasa.gov/view/18305

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